

and floating icebergs, and all the country south of it above water and clear of those influences. Since then the large granite boulder on the shore of Barnstaple Bay, estimated to weigh ten tons, has been brought more prominently under our notice by Mr. W. Pengelly (*Trans. Dev. Assoc.* vi. 211), and several others by Mr. T. M. Hall (*Id.* xi. 429), discovered by excavation. All these are travelled blocks, and probably ice-borne. Many attempts have been made by ardent and intelligent students of late years to detect proofs of glacial action further south, and even to the shores of the British Channel, but hitherto with doubtful success. There lies on the greensand of Haldon, near Exeter, and on the Blackdown Hills, stretching away towards the south-east corner of the county of Devon, a stratum of tough yellow clay full of white flints, mostly angular. About Haldon and eastward over Pitminster and Churchstanton, many white quartz rounded pebbles, foreign to the accompanying beds, are met with. Farther south, between Honiton and the sea, this stratum of flints and clay in some places is seen to be from forty to fifty feet thick, and the best section of it is in the gravel pits near the cliff on Peak Hill, on the west of Sidmouth. By some persons this deposit has been regarded as the thinned-out edge of the plastic clay formation, containing the remaining flints of the washed-out chalk, still found more perfect at Beer Head, a few miles east. Whether it was this, or whether it was a boulder clay, so called, it is well to remark that, though thickest on the flat tops of the hills, it seems to lap down over their sides, as if it had been deposited after the valleys and the elevations had come to their present conformation; and at two places at least to be visible in the valley of Sidmouth—one under the great blocks of breccia in the orchard near the brook on the Boomer or Boughmoor Estate, and the other on a subordinate hill in a grass field, at about 200 yards from Jenny Pine's Corner, walking down the new road towards Cotmaton, and on the right-hand side. Most of this latter patch of clay and flints was dug away two or three years ago to assist in forming the new road.

When engaged in making certain trenches and excavations on the top of Salcombe Hill in 1879 for archaeological purposes (see *Proceedings Soc. Antiq. Lon.* viii. 209) it appeared that the yellow clay, to the depth of two or three feet, was not so much encumbered with flints as deeper down. But whilst thus engaged, what struck me as rather strange was that numerous fragments of black peat were more or less generally but irregularly distributed through the upper two feet; and bearing in mind Mr. Nield's letter, I have in my foregoing remarks been trying to lead up to this point. The cases may not be similar, but they are worth comparing. The land on the top of the hill at this place still bears its wild growth of heath and furze, and has never been subjected to the plough or to cultivation of any sort; so that the clay has not been disturbed by the hand of man. It is too soon to say that this capping of clay and flints is of glacial origin; but some of the indications that have suggested the idea may be observed in the section in the gravel pits on Peak Hill, especially when fresh dug down. They are: (1) that no horizontal bedding is visible, as there would be if the deposit had been made in a large body of undisturbed water; (2) That, on the contrary, waving and distorted lines are sometimes very plain, one instance of which I carefully sketched and coloured in January, 1875; (3) and that the long axes of the embedded flints do not as a rule lie horizontally, as they would necessarily do if they had settled at the bottom of a sea or pond, just as an egg will lie on its side, and not on its point, but they are distributed through the soft mass at all angles, as raisins lie in a pudding that has been kneaded up together.

My object in this communication has been merely to compare the case of the peat mixed with the clay on Salcombe Hill with the somewhat similar case occurring near Oldham.

P. O. HUTCHINSON

Old Chancel, Sidmouth, Devon, October 4

IN NATURE, vol. xxii. p. 511, I find a letter from Mr. G. H. Morton, in which he expresses an opinion contrary to that expressed by me (vol. xxii. p. 460), as to the age of the "peat bed in the drift of Oldham." The section therein alluded to is fairly described by him, but I am surprised that he should for an instant entertain the belief that the clay "has simply slipped down off the sand on to the surface of the peat at a lower level." Had the clay slipped down we ought to have been able to see some indications of the conjectured displacement. Let me say, however, that during my repeated visits to the place and my examinations of the section I have utterly failed to perceive any

trace of such indications, and, moreover, I do not remember that one person out of some scores who have in presence of the section pointed out to me the slightest appearance of disturbance. There is not a broken or crumpled line in the whole section.

The peat bed, and indeed the whole of the section, is now, I am sorry to say, covered up; but in and about Oldham we have a large area covered by what I believe to be typical beds of the "Middle" and the bottom of the Upper Drift—alternations of gravel, pebbles, fine and coarse sand, the latter showing lines of "current bedding," and occasionally clay with boulders—in which many similar sections, but wanting in the peat, of course, may be seen, and in which the position and surroundings of the beds quite forbid the possibility of "slipping." The idea of the upper clay "having been excavated and thrown down" is, I think, too improbable to be seriously entertained, seeing that the surface-soil and subsoil on the top of it are of the usual thickness common to the neighbourhood.

The "blue silt" alluded to by Mr. Morton as giving strength to his suspicions, I can assure him is one of the supports upon which I rest my opinion that there has been no disturbance. Do I understand him to mean that the silt is the result of the washings of some passing stream? If so, let me recommend him to visit the railway cutting across the large peat bog a few miles from here, and known as the "Ashton Moss," where he will find, at the bottom of a bed of recent peat, of from two to three yards in thickness, a thicker, but in every other respect a similar band of blue silt, upon which the peat rests throughout the length of the whole cutting. This silt seems to have its equivalent in the "floor clay" which accompanies our seams of coal. I believe that the removal of so much of the peat bed and drift deposits from the face of the excavation as has already taken place has served all the purposes of the "few hours digging at a right angle to the present exposure," suggested by Mr. Morton.

Perhaps a more complete acquaintance with the Oldham drift beds would bring Mr. Morton nearer to my way of thinking. I shall be glad to see him here again, and to assist him in making a wider, and more thorough examination of them.

29, Radcliffe Street, Oldham, October 7 JAMES NIELD

Temperature of the Breath

MR. McNALLY has, it appears to me, missed the point of my observations on this subject.

His own experiments, though they show a temperature obtained by breathing on a thermometer through silk, wool, and linen, considerably above the accepted temperature of the breath, are by no means an exact repetition of mine. He only breathed through four folds of the material for three minutes. I breathed through a much greater amount of material and for a longer time, viz., twenty to thirty folds tightly encircling the thermometer bulb for five minutes.

The temperatures I obtained were very much higher than those observed by your correspondent. Thus on a warm summer day the temperature obtained on rising in the morning before dressing and before eating was 106°. In the afternoon, after playing a game of golf, when returning home by rail with all the windows open, the temperature observed was 107°. The same day, after dinner (without alcoholic stimulants), the thermometer rose to 108° when breathed on in the way described. The temperature of the air that day averaged 70°. Since then I have not obtained a higher temperature than 107°·5.

These temperatures were obtained by breathing through a silk pocket-handkerchief tightly rolled round the thermometer, but I have obtained temperatures nearly as high when the thermometer was wrapped up in cotton or woollen stuff.

Mr. McNally asserts that the explanation suggested by my friend that the high temperature thus obtained was owing to the heat evolved by the condensation of the aqueous vapour contained in the breath is "undoubtedly correct," but he gives no answer to the obvious objection to this explanation, viz., that if the real temperature of the breath be, as stated in physiological works, 95° to 97°, condensation of the aqueous vapour in it would only take place as long as the material through which it is propelled was of lower temperature than the breath. When the material attained a higher temperature than 97° the aqueous vapour, in place of being condensed, and thus evolving heat, would be still further evaporated, and hence be a cause of reduction of temperature.

The fact that woollen clothing prevents chill after exercise has

no bearing on the subject of the high temperatures obtained by breathing through woven material on the bulb of a thermometer, for no one has yet observed that woollen clothing will develop a heat greater than that of the body it covers, viz., $98^{\circ}5$.

The hygroscopic properties of different materials afford no explanation of the phenomena, for the power of materials to imbibe moisture will not account for an increase of their temperature by breathing through them.

My speculations may be right or wrong; Mr. McNally has not shown them to be either. My facts are not the less true from being incompatible with "ascertained physiological truths," for ascertained physiological truths are only true so long as they are not controverted by other ascertained physiological truths.

My experiments show that the temperature obtained by breathing on the thermometer in the manner described is higher when less caloric is abstracted from the surface of the body, lower when the surface of the body is losing more caloric. Thus on a warm summer day my breath raised the thermometer to 108° , whereas to-day (a cold wet day) it only raised the thermometer up to 103° . Does not this seem to show that respiration is a means of getting rid of the superfluous caloric generated in the body, and that when this excess of caloric cannot be got rid of by the skin it passes off by the breath? R. E. DUDGEON

October 9

Selenium

As the only chance of being able to transmit images of reflection through a conducting wire, in the way sound is repeated to a distance by telephone, appears to lie in the preparation of a fairly transparent sheet of metallic selenium; it may tend to advance the subject if the difficulties experienced in dealing with this substance are mentioned.

Selenium in its vitreous condition melts about 220° Fahrenheit, and can be drawn out between mica plates over a lamp, to a thin transparent red film. But heated for some time it turns black and granular, apparently absorbing hydrogen, then melts only at 423° F., and is brittle and intractable. Unfortunately it is only in this crystalline state that its power of conducting electricity appears, and varies with the light under which the selenium is placed.

Prepared in the mass, electrically conducting selenium is as compact as the hardest gas carbon, with the shiny appearance and surface of graphite. How to reduce such a substance to any degree of transparency is perplexing. By reducing it to fine powder, and subjecting the black selenium to severe hydraulic pressure between hot polished steel plates, the desired effect might be produced. Selenium also dissolves freely in chloride of selenium, Se_2Cl_2 , and precipitates slowly in a botryoidal mass of black selenium. It also separates in the crystalline form from concentrated solutions of selenide of potassium or sodium.

There is some uncertainty as to whether a transparent sheet could be more easily obtained by the method of precipitation, than by mere mechanical treatment. But the investigation is one that requires to be carried out with the aid of a fully equipped laboratory, and is beyond the power of an ordinary experimentalist.

To devise a successful mode of making a black substance like graphite at all translucent, requires a distinct understanding of the reason why bodies are opaque. Something more than an explanation in general terms is needed before camera pictures can be resolved into electric currents, and again integrated upon a receiving plate.

Perhaps some of the readers of NATURE may be able to suggest a method of dealing with selenium that will produce thin transparent sheets capable of conducting electricity.

London, October 16

A. T. F.

Dynastes Hercules

THE reviewer of Ober's "Camps in the Caribbees" (NATURE, vol. xxii, p. 216) appears to doubt the story of the habits of the large Hercules beetle, *Dynastes hercules*, given by Ober on the authority of his guide. It is nevertheless perfectly true, and I have myself witnessed the occurrence twice in this neighbourhood, where the beetle is not uncommon. In the first instance I noticed it on a branch of *Ochroma lagopus*, and the second time on a species of *Bombax*, both very soft-wooded trees. The branches in each case were about three-quarters of an inch in diameter, half an inch being formed by the wood. In both cases I saw the performance of the animal most distinctly, just as described by

Ober's guide, and I took not only a piece of the severed branch with me, but secured also the second animal. The noise is not so much produced by the cutting of the branch as by the open wings passing rapidly through the air during the rotation of the beetle. I do not believe there is anything of a sexual call in the manoeuvre. The beetle wants to get at the abundant juice of the young branches. It is called in this country *aserrador*, i.e. *sawyer*. *Golefa porteri*, an allied insect of the same family as *Lamellicornes*, behaves in a similar way, but chooses of course thinner branches. A. ERNST

Caracas September 9

What is Alrese?

In the large *Encyclopédie* published by Diderot and d'Alembert, vol. xii, p. 224 (edit. in folio) there is mentioned amongst the substances used for poisoning water to catch the fish, *l'herbe qu'on appelle l'ALRESE*. Littré has no such word, nor anything like it, nor indeed any other lexicographer I am able to consult here. I should be much obliged for any information on this name, or the plant referred to. A. ERNST

Caracas, September 9

Rainfall of Sierra Leone

As I believe there is little account taken of this climate at home, and as perhaps it might interest you, I send you an account of one day's rainfall this month, which is an excessive amount even for Freetown, and equal to one-third the whole year's rainfall for Dublin, I believe:—

Rainfall registered in the Colonial Hospital, Freetown, 50 feet above Sea-level

	Inches.
From 6 a.m. to 4 p.m. September 11	6'35
From 4 p.m. to 6 a.m. September 12	4'05
Total in 24 hours	10'4

Garrison House, Freetown,
September 16

W. HUME HART,
Colonial Surgeon

An Octopus

I INCLOSE an account of an enormous octopus which was thrown on the shore at Kilkee, Co. Clare, in the last great storm. As strangers find my uncle's hand very hard to read, I have copied his letter.

Ardanor Foynes

C. G. O'BRIEN

"Saturday, October 9, 1880

"I am sorry you were not at Kilkee when a great octopus was stranded on the side of the Duggerna reef on Thursday last. Its arms had been partially broken: there were eight of them, each as thick as a strong man's upper arm, and beneath each were two rows of suckers like cupping-glasses, more than a shilling size in circuit. When perfect, each of these arms must have been from twelve to fifteen feet long, and from the point of one arm to that of its opposite was a length of nearly thirty feet. The animal's length from the insertion of its suckers to the end of its body must have been nearly twenty feet, perhaps more. Its mouth, like a parrot's beak, was as large as two joined hands of a large man with the fingers outstretched. It weighed about 4 cwt. Its head was $1\frac{1}{2}$ inch in diameter, about three feet long; its eyes of the size of the inner circuit of a breakfast-plate. A monster. The under colour that of the under side of a turbot." —(From a letter of the Rev. R. J. GABBETT.)

SYNTHESIS OF CITRIC ACID

AS we intimated last week, another brilliant synthesis has recently been accomplished in the domain of organic chemistry. Messrs. Grimaux and Adam have succeeded in building up the characteristic acid of lemons from glycerin. Glycerin may be regarded as trihydroxypropane, $\text{C}_3\text{H}_5(\text{OH})_3$, and citric acid as hydroxypropanetricarboxylic acid, $\text{C}_3\text{H}_4(\text{OH})(\text{CO}_2\text{H})_3$. To convert glycerin into citric acid it was therefore necessary to replace two hydroxyl groups, and one hydrogen atom, by the group CO_2H (carboxyl). This was done as follows:—By the action of hydrochloric acid on glycerin, dichlorhydrin,